

CLAIMS

1. A clamping device that is engageable detachably with a vertical bore of a workpiece for locking it, comprising;

a clamp body,

a pull rod mounted in the clamp body in a manner in which it is vertically movable and protrudes upwardly,

a tapered rod portion provided at the top end portion of the pull rod and having a diameter increasing toward the top,

a collet member provided with a collet fitted on the tapered rod portion, which is elastically deformable in a diametrically expanding manner and which is slidably fitted on an upper half of the pull rod,

an annular collet supporting member that abuts against a bottom of the collet member for supporting the collet member from below, and

a hydraulic cylinder for biasing the collet supporting member upward and driving the pull rod downward; wherein the hydraulic cylinder comprises;

a cylinder bore formed in the clamp body,

a piston member slidably fitted in the cylinder bore for driving the pull rod downward, and

an annular hydraulic chamber formed by the cylinder bore, piston member, and collet supporting member, wherein the piston member has a greater pressure receiving area than a pressure receiving area of the collet supporting member in the annular hydraulic chamber.

2. The clamping device according to claim 1; wherein the collet supporting member has a top end wall at the top end,

the upper half of the piston member is slidably fitted in the collet supporting member,

and the top end of the piston member abuts against the bottom of the top end wall when hydraulic pressure in the annular hydraulic chamber is released to unlock the workpiece.

3. The clamping device according to claim 1 or 2; wherein the pull rod is horizontally movable by a specific small distance relative to the piston member, and the collet member is horizontally movable relative to the clamp body together with the pull rod.

4. The clamping device according to one of claims 1 to 3; wherein a spring housing chamber is provided in the clamp body under the pull rod and springs for biasing the pull rod upward are placed in the spring housing chamber.

5. The clamping device according to claim 4; wherein it is provided with an air blow means for guiding pressurized air supplied to the spring housing chamber to the tip of the collet and ejecting it.